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ABSTRACT

A research project sought to develop means of measuring children's attention to instructional films. Groups of five educable mentally handicapped (EMH) students watched films; observers noted their attention or inattention to the screen at five-second intervals. Data for the groups were then compiled via time series analysis procedures to yield a composite index of viewer attention for the given intervals. The results showed that the younger students exhibited greater variances in attention, that there was a positive correlation between attention and content learned, and that media presentations could be grouped and ranked with respect to their attention-holding power. It was concluded that the observation technique and the time series analysis method were useful means which would permit researchers to: 1) discriminate among segments of a film with different attention levels; 2) analyze content across and between attention levels; and 3) establish attention files for groups of students, subject matter areas, and media presentations. (PB)

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RESEARCH REPORT #7213
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ATTENTION PROFILE: EVALUATION OF INSTRUCTIONAL MEDIA

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ABSTRACT

An index of the relative entertainment appeal of instructional films is obtained by measuring a child's interest by continuously recording his visual orientation toward or away from the media screen during presentation. Graphing the fluctuations in audience interest for a particular film permits analysis of the film from moment to moment to discover those elements which were most compelling of attention and those which failed to hold the interest of the sample audience.

Observer reliability for gathering attention profile data has been established and a methodology for time series data analysis has been employed.

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IR 000 367

SPECIAL REPORT No.7213
COMPUTER-BASED PROJECT for the EVALUATION of MEDIA for the HANDICAPPED

Title: ATTENTION PROFILE: EVALUATION OF INSTRUCTIONAL MEDIA

BY: Thomas E. Grayson

BACKGROUND

The Computer Based Project for the Evaluation of Media for the Handicapped, based on contract #OEC-9-427617-4357 (616) between the Syracuse (N.Y.) City School District and the Media Services and Captioned Films Branch, Bureau of Education for the Handicapped (United States Office of Education) for the five year period July 1, 1969 through June 30, 1974. The major goal is to improve the instruction of handicapped children through the development and use of an evaluation system to measure the instructional effectiveness of films and other materials with educable mentally handicapped (EMH) children, in-service training and media support for special teachers, and studies related to the evaluation process and the populations used.

The Project has concentrated on the 600 films and 200 filmstrips from the Media Services and Captioned Films (BEH - USOE) depository; however, specific packages from Project LIFE, various elementary math curricula, and selected programs from Children's TV Workshop have also been evaluated. The evaluation model used requires that: 1) objectives of materials be specified and written; 2) instruments be constructed to test and measure effectiveness; and, 3) children be the major sources of evaluation information. A number of instruments and methodologies are employed in the gathering of cognitive and affective data from 900 EMH children and 80 special teachers to make the effectiveness decisions. Over half of the EMH population can neither read or write; therefore, a unique Student Response System (SRS) is employed, consisting of a twenty station G.E.-1000 SRS which can be operated in a group or individual recording mode and is connected to a remote computer system. The computer capabilities consist of remote telephone connections to the Rome (N.Y.) Air Development Command, the Honeywell time-shared network, and the Schenectady (N.Y.) G E Research and Development Center; and batch mode capabilities of the Syracuse City Schools, Syracuse University, and various commercial sources.

In-service and media support activities provide on-the-job training for teachers, teacher aides, equipment, and materials to the special teachers in the city schools. The research activities have centered around investigations and special problems related to the development of the evaluation model. The four major areas considered are: 1) testing effects, 2) captioning effects, 3) special student characteristics; and, 4) evaluation procedures validation.

Documentation of the major activities appear in the five annual reports and the 600 evaluations prepared on materials used. Staff members were encouraged to prepare special reports and the attached paper is one of these. The opinions expressed in this publication do not necessarily reflect the position or policy of the Computer Based Project, the United States Office of Education, or the Syracuse City School District, and no official endorsement by any of the agencies should be inferred.

The Computer Based Project measures a child's "interest" in a material by continuously recording his visual orientation toward or away from the movie screen during the film presentation. This results in an index of the relative appeal ('reward') of any given film. Graphing the fluctuations of student attending-behavior permits the researcher and others to analyze the film from moment to moment to discover those elements which most attract attention and those which fail to hold interest of the sample audience (Palmer 1963).

Films are a one-way medium; therefore, when a child views a film, it is clearly an individualized experience. If there is feedback and reinforcement added, it is assumed to be instrumental in learning. Furthermore, any verbal or visual medium which induces the child to attend closely to spoken sounds or visuals can be a useful instrument for training in discrimination learning, as well as for other learning tasks.

Attention can be defined by a response or set of responses in a specified stimulus condition: the measure of the response is usually continuous, immediate, and hopefully objective and sensitive (Lindsley, 1962).

Measures of attention are based upon some general assumptions related to the gaining of knowledge (information) from engaging in some form of activity. It is generally assumed that:

1. Information gained has high correlation with the degree to which one attends.
2. The more one attends, the greater the learning potential.
3. A decreased amount of attention to a stimulus will result in a decreased amount of learning.

When considering visual attention as the primary measure of interest in a film, book, T.V., filmstrip, etc., it is assumed that comprehension is greater when attending than when not attending.

Palmer (1968) developed a procedure for collecting and charting attention behavior of pre-schoolers while viewing television. The results of these charts were used to determine the effectiveness of program sequences which would be included in the final broadcast (Sesame Street 1968). Palmer's basic procedure for obtaining attention data has been adopted as part of the media evaluation procedure used at the Computer Based Project.

PROCEDURE:

Basically the procedure is as follows:

The dependent variable being measured is the number of students with eyes on screen. The independent variable is a pre-selected film to be evaluated at 5 second intervals. The attention response is defined as eyes focused on, or directed toward, the screen.

Two dimensions are considered and collected simultaneously, i.e., time samples and the number of subjects. After some experimentation with the length of time intervals and subject sample sizes observed, a

5 second time interval and samples consisting of five randomly selected students were used for data gathering situations.

The attention response is recorded by two observers positioned in front of a group of students so as to clearly see 5 subjects' eyes as they view the media. When the student appears to be looking in the direction of the screen during the film presentation, an attention response is recorded. Recording begins with the presentation of audio or visual stimuli from the film. A record is made of the number of the selected 5 subjects whose eyes are fixed on the media image at each 5 second interval on a form such as shown in Figure 1. After several showings, samples of 5 subjects who saw the same media are compiled into a time series line graph indicating the frequency of subjects watching at each time interval. This composite frequency graph yields a visual representation of the attention behavior exhibited during the length of the media presentation.

The results reported from the data are used to: 1) locate and identify areas (segments) of films where test item discrepencies appear, 2) analyze content area at different attention levels, and 3) establish attention files for various classes of children and for subject matter areas for a specific piece of media.

ATTENTION OBSERVATION TECHNIQUE

MATERIALS AND EQUIPMENT

1. Media (film, filmstrip, T.V., etc.)
2. Projector and screen.

3. Recording data form and pencil (see appendix 1).
4. Stop watch.
5. Observation chair.

The observation technique consists of recording the frequency of a given number of children watching a visual presentation on a time interval basis so that comparisons can be made between the observed level of attention and the visual experience that was presented. Some major considerations in the technique are:

SIZE OF SAMPLE

A minimum of 5 children are to be randomly selected out of the audience by each observer. The sample should be easily viewed from the observer's position, and different samples should be selected when there is more than one observer present during a showing.

TIME INTERVAL

Recordings of the frequency of "eyes on screen" within a sample is made at 5 second intervals, i.e., as the sweep hand of the stop watch passes each 5 second number -- (5, 10, 15, ... 60). The stop watch is started with the presentation of either audio or visual stimuli from the film.

ATTENTION RESPONSE

When the eyes of the child are judged to be "fixed" on the screen at the moment of observation for the time interval, the child is regarded as attending.

ATTENTION OBSERVER RELIABILITY

A recent study shows:

1. A bias to the correlation value of r which indicates that heavy consideration of a correlation coefficient as an indicator of interobserver reliability should not be given.
2. A graphic representation of data showing agreement, disagreement, direction, and frequency is a useful tool for determining interobserver reliability.

INTERRUPTIONS

There are situations where a member of the sample will be interrupted or disturbed, consequently affecting his attending behavior.

a. If a subject leaves the audience, select another subject as a replacement and continue observing.
b. If a subject is interrupted by a teacher or an observer, select another subject at the time of the interruption.
c. If a selected subject is not attending to the media during its showing, keep the subject in sample and record as not attending.
d. If there are equipment malfunctions, stop observing and take corrective action. Return to observing, noting the minute and second on the stop watch, and record the next observation in the box for that minute of time.

TIME SERIES ANALYSIS OF ATTENTION DATA

Speigel and Murry (1961) have defined a time series as a set of observations taken at specified times, usually at equal intervals. When the independent variable x is time, the data (dependent variable y) shows the values of y at various time intervals. Mathematically, a time series is defined by values y1, y2, ... of a variable y (frequency of "eyes on screen") at time t1, t2, ... thus y is a function of t.

A time series with variables y at specified times is pictorially represented in Figure 2. The data, expressed in this way, yields a graph of a time series of attention frequency of 5 children during a 5 minute film segment.

After graphing attention data for several films, it was apparent that identifiable similarities in the curves could be discriminated; however, the cause of these similarities (population variables or media variables) remained unknown. It was determined to use a moving average computation to plot the points on the graph in order to remove some errors of observation and to smooth out the curve. This was done by assigning a value to a point equal to the average of the preceding point (observed frequency), present frequency point, and following frequency points.

A study of the utility of the moving average curve is now in progress. The concerns and questions being answered are:

1. With attention as the variable, what is the cause of its variability? Is it in terms of content, mode of presentation, stimulus properties, captions, etc.

2. Can the attention curve be used to verify and predict attention for other films?
3. Can strong general trends be identified? That is, to what extent is what we observe responsible for variability of attention; and are there inconsistencies in observations?

In our investigation so far, we find a graphic representation of attention data (attention profile) useful in several ways:

1. It is used as a check on priority classification of films. That is, if a film has a high attention profile, it confirms the classification of a film as being good.
2. The attention profile is used to determine attention spans and viewing characteristics of a given classroom, e.g., differences between the curves of viewers have been found to correspond to developmental variables such as age, reading achievement, etc.
3. Another use is in pointing out common attention areas of a specific media across various groups.

CBP findings on attention seem to indicate that different presentations have different profiles; that younger (6 - 10 years, EMH) children have a greater range of variance than older children; that a relationship exists between high mean attention and content learned; and that media can be grouped and ranked on attention variables.

Many unanswered questions persist; however, at present, the attention procedure adds dimensions to our research. The procedures

used to obtain the attention profile data are currently being reviewed in terms of their relevance in evaluating films. Although a film may maintain attention, other effects in terms of subsequent behavior by the student have not been measured. However, efforts in developing reliable procedures for maintaining attention during film presentations are continuing based on results obtained from the procedures reported here.

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ATTENTION PROFILE

MEDIA TITLE: _____
MEDIA NUMBER: _____
DATE: _____

INVESTIGATOR: _____
SCHOOL _____
CLASS NUMBER: _____

Minute Beginning

0							1					
2							3					
4							5					
6							7					
8							9					
10							11					
12							13					
14							15					
16							17					
18							19					
20							21					
22							23					

Minutes Running Time

1 2 3 4 5 6 7 8 9 10 11

COMMENTS:

STUDENT SEAT OBSERVED

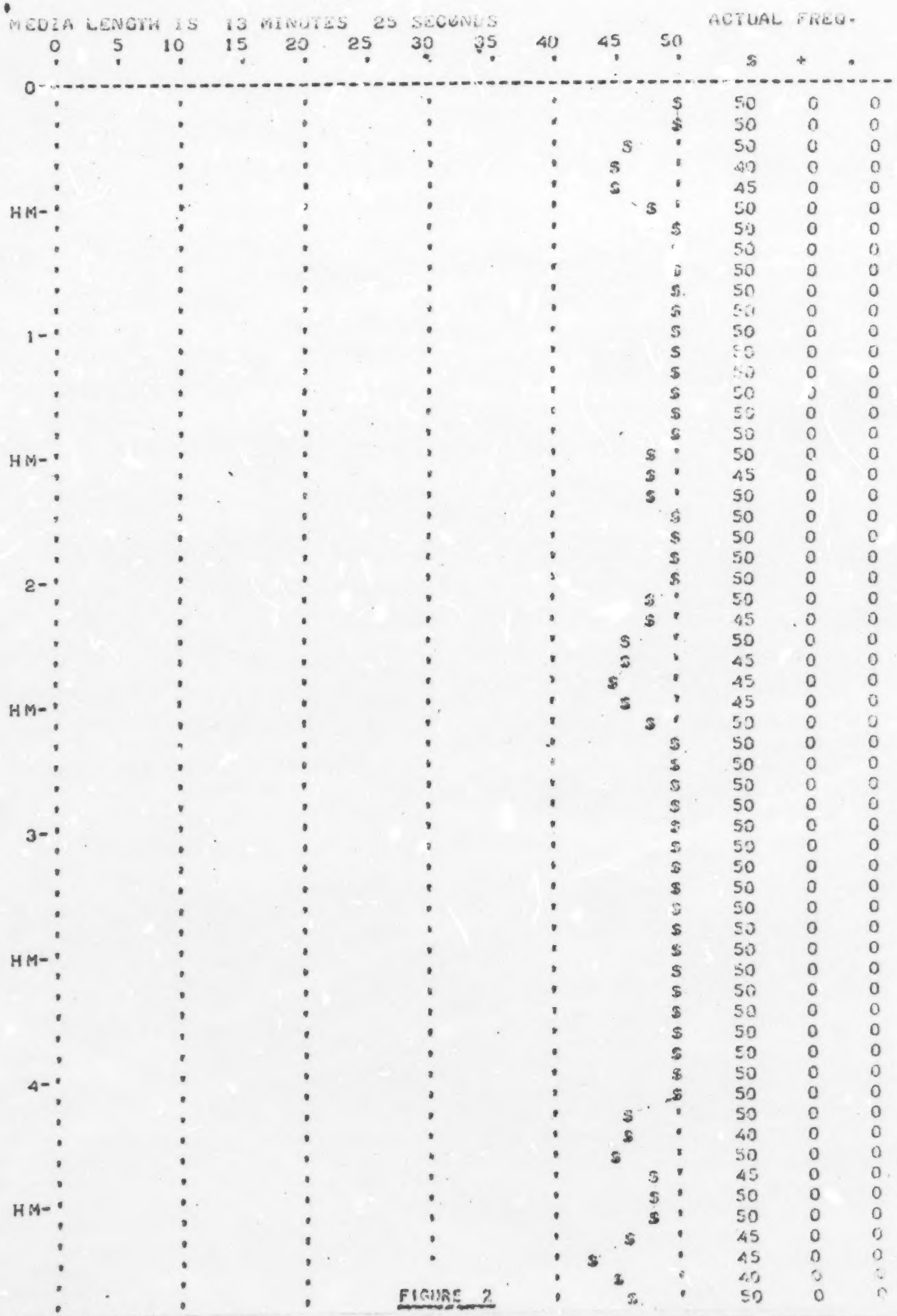
rear

11	12	13	14	15
6	7	8	9	10
1	2	3	4	5

SUBJECTS ATTENDING

1072

MEDIA LENGTH IS 13 MINUTES 25 SECONDS



ACTUAL FREQ.	$	+	.
	50	0	0
	50	0	0
	50	0	0
	40	0	0
	45	0	0
	50	0	0
	50	0	0
	50	0	0
	50	0	0
	50	0	0
	50	0	0
	50	0	0
	50	0	0
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	45	0	0
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	50	0	0
	45	0	0
	45	0	0
	40	0	0
	50	0	0

FIGURE 2